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ABSTRACT

The Educational Products Information Exchange Institute (EPIE) produces independently researched information on instructional material. The author believes textbook evaluation must be viewed in terms of the learner. The school, as a human system, may move toward effective expressive, productive interactions with internal and external environments or it may move to a diametrically opposed position. It may also move toward expressive, but destructive interactions with its internal and external environment. When the learner evaluation of instructional material is positive, intended learning takes place and his internal environment has been effectively changed. If the learner evaluation is negative, the learner's energy is unavailable for any productive change in internal environment. When a substantial amount of learner energy within a school building is negative, that school becomes highly entropic. Appropriate instructional technology is an effective method of reducing educational entropy. The Degrees of Reading Power (DRP) technology has been used by EPIE since January, 1982. This technology enables EPIE to establish precise measures of misfitting specific materials to specific learners. The development and selection of instructional materials must start at the current level of the learner and move him to new levels of knowledge and understanding. (DWH)

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AFFECTING THE SYSTEM THROUGH PRODUCTIVE EVALUATION

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AFFECTING THE SYSTEM THROUGH PRODUCT EVALUATION

First of all, let me say that I agree that there is a need for a new paradigm for textbook evaluation -- and for the evaluation of instructional materials in general. I also believe that the validity of such a paradigm should be judged by its potential for effecting improvements in the instructional effectiveness of textbooks and related classroom materials. I have felt this way for at least 15 years.

Evidence of this fact is that in 1967, with the help of Bob Stake and Terry Denny, and contributions by others like Jack Easely, Irving Morrisett, Ira Gordon, Fred Goodman, Maury Eash, Harriet Talmage, and Mike Scriven, I started on what, at times, seems to be something akin to an eternal quest and at other times is more like a masochistic exercise. This exercise is known to the school consumers it is designed to serve as The Educational Product Information Exchange Institute; more commonly known as EPIE ("EPPY").

Whatever else it is, EPIE has been, and continues to be, an exercise in paradigm building that is continuously being shaped by the real world of instructional materials evaluation (the core of which is, for better or worse, textbook evaluation). And if this evolving paradigm has validity, it may come from the fact that its tangible output in the form of independently researched information on textbooks and other instructional artifacts is valued enough by the people who evaluate and purchase textbooks to sustain its existence from year to year. This exercise in real world product evaluation has been -- and continues to be -- a bit like the proverbial 'building the bicycle while riding it.'

More accurately, it is very much an adaptive, evolutionary response to certain technological and ecological facts of educational and economic life in the last quarter of the twentieth century.

Thus, unlike those "evaluators" who currently are receiving nationwide press coverage for their criticisms of science textbooks, EPIE has learned to believe in evolution -- even when it comes to such a refractory human endeavor as textbook evaluation. But like those anti-evolutionists, the creationists, I too find myself operating a good deal on faith. Faith that, over time, more and more educators and people in general will realize: (1) that the evaluation of instructional materials is no more a single issue matter than are other important public interest issues, (2) that the evolution of instructional materials evaluation does, indeed, involve, as Thompson's proposed paradigm suggests, a multi-level, multi-faceted task of fitting into a complex socio-psychological-political economic environment, and (3) the success of that fit ultimately is judged by learners.

My very real problem with the Thompson paradigm is not that it is incorrect, but that it invites us to stay at a macro-level of analysis. And complex as the task of fitting textbooks into their ecological niche is, it is still only a macro-level fit. My particular concern is with the equally complex task of fitting that must also be accomplished at the micro-level. By micro-level, I mean to call attention to that ultimate level at which the ultimate evaluation of every instructional material is carried out by the ultimate consumer, the learner. It is only when we have begun to attend to this ultimate level of evaluation, far better than we now do, that educational product evaluation, will really have evolved to something that can lead to better decision-making about instruction and learning.

Considering the need for such an evolution, it is probably a good idea that our evaluation paradigm seems to have evolved beyond Cronbach's communications paradigm and Tudor's engineering paradigm toward a systems analysis paradigm

as suggested by Thompson. This is movement in an appropriate direction. And ultimately, this direction must take us closer and closer toward the ultimate evaluation of any instrucitonal material which is provided by the learners who used it. The criteria that will be applied by these learners will be many, but they add up to the appropriateness, or fit, of a material to a learner.

What I am suggesting is that the systems analysis paradigm outlined by Thompson presents a very real difficulty inherent in all macro-system analysis: the size of the system to be analyzed. This is particularly true when the system is a living, non-mechanistic system containing all the inescapable complexity inherent in an open, evolving, living system. When it comes to instructional materials, macro-level analysis is theoretically interesting from a contextual point of view, but not very useful in dealing with real world evaluation and decision-making. That is, it is difficult to do anything of real importance with it other than recognize its value as a theoretical map of the territory -- a context for discussion. If we want to improve instruction and learning through materials evaluation, we must focus in on the analysis of a more manageable sub-system, of the macro-system described by Thompson.

For a number of years now, I have been trying to clarify my own thinking as to what this more appropriate, manageable, and ultimately more useful sub-system of analysis might be.

For a time, I thought this subsystem had best be limited to the interaction of the learner and a learning material. After all, I argued, doesn't the material contain all the social, economic, political, and cultural decisions, habits, traditions, and concomitant constraints of the entire macro-system that produced it? True, but most textbooks and other instructional materials are used in a system containing a teacher. (My, how those real-world complications creep in!) But, does the material function as <u>an aid</u> to the teacher (as a

"teaching aid")? Or, does the teacher (who can become surprisingly dependent upon a material or teacher's manual) function as an aid to the material? Or, when material is misused by a teacher, is the teacher functioning as a hindrance to the material's otherwise potentially effective interaction with the learner? For a time, I felt that this complicated learner-teacher-material interaction was the micro-system to be analyzed. But then there was a question: Don't other learners, as well as the teacher, sometimes help or hinder the interaction of the learner with a material? The subsystem seemed to be growing both in size and complexity. My question became, "Is it already too large and too complicated to be analyzed?

I spent some time pondering that question. Then I began to spend more and more of my time in classrooms observing the use and, very often, the misuse of instructional materials. I found that this frequent misuse of materials was not so much misuse but rather a misfitting of materials not just to learners, but to their teachers as well.

I then found, that while sometimes this materials-to-teacher misfitting was the result of a poor or uninformed decision that had been made solely by the classroom teacher, more frequently the misfitting resulted from the fact that someone other than the teacher had made the decision about what material that teacher would use. It is interesting to note that learners are not insensitive to such misfittings.

"I don't think this textbook is so bad, as textbooks go, but she sure doesn't like it." This is what a teenager had to say while jerking his head toward the teacher in the back of the classroom. Thus, not even the self-contained classroom is a contained enough subsystem to function as the exclusive unit of analysis. However, if we go one step further to the school building, I believe that a strong case can be made that we have a unit that is both small enough and complete enough to render valid analysis. This is not to say that

the components of the building as a subsystem are not a complicated set of interacting variables. They are, indeed, but it is my hope that they are manageable in number and close enough to the micro-level to be able to discern things that are both valid and reliable about the "ultimate evaluation" by learners of all instructional materials.

My current thoughts about how to analyze the school building as the subsystem of analysis are very simple. It's applying them to the dynamics of the teachers-learners-materials fit that gets complex. However, at present, I don't feel the complexity is so great as to defeat the enterprise -- provided certain things are kept in mind.

The first of these is that a school is a system of human energy, mandated by the community to pursue certain social and intellectual goals. It is important to keep in mind that everything that happens in this energy system called a school -- from the culturally productive activities called social and intellectual learning, to the capricious, non-productive, socially disruptive acts that can make such learning impossible -- happens through the expenditure and interaction of the human energy within this system.

Given this view of a school, whatever else the community expects of its school, it expects it to be a system in which -- to the highest degree possible -- the human energy in that school is effectively available to the mandated social and intellectual purposes of that system. Disruptive, anti-social behavior is evidence of energy that is effectively unavailable to the social and intellectual purposes of the school as a human energy system. Apathetic purposeless behavior is also evidence of energy that is likewise unavailable to the system.

In any human system -- whether a school, a family, or an individual, the available energy tends to move in one of three directions: (1) toward effective, expressive, productive interactions with both its internal and external environment, (2) toward ineffective, depressive, nonproductive interactions with its

internal and external environment, or (3) toward expressive but distructive interactions with its internal and external environment.

When it comes to the school as an energy system, the community expects the managers of the human energy that makes up the school to see to it that -- to the highest possible degree -- the available energy will be moving in the first of these directions (toward effective, productive interactions). The attention currently being paid to "time on task" in classrooms by educational researchers and school practitioners is a recognition of the community's expectation regarding a school's management of the human energy available to it.

What we have only just begun to admit is that most of that potential "time on task" (as much as 90-95% of it) is spent using instructional materials.[1] Now what really happens to the human energy available to the system during this 90-95% of classroom time when materials such as textbooks are being used? As already implied, one thing that is happening to the learner's energy is that it is involved in an ongoing evaluation of the material it is interacting with. And based on my observations and questioning of students using materials over the last 15 years, I suggest that the operant evaluative criteria being applied by these learners, are imbedded in questions that go something like this: Can I understand this material? Can I do what the material requires me to do? Does the material make me want to do this? Is the material capable of helping me to learn things I don't already know; or, does it bore me and insult me by requiring me to use my energy to do something I already know how to do? Is what it's designed to teach me something I can see a need to learn? If I can't see a need to learn it, but am told I must learn it, does the material at least help me learn it without straining me to the point of frustration?

If, and only if, this learner evaluation is positive, can we judge the time the learner spends with that material to be qualitatively "on task." And if the material is, in fact, positively evaluated and the time spent with it is qualitatively "on task," what then is the result?

The result is that a specific complex of facts, skills, concepts, attitudes, etc. that were judged important enough by the community to be built into the instructional material in question have been in-structured into the internal environment (i.e., head and nervous system) of the learner. Put another way, intended learning has taken place, and the learner's internal environment has been effectively changed.

However, if the learner's evaluation of the material is negative; if his or her internal environment remains closed to these intended changes, or it has previously internalized those particular changes, the learner's energy is simply unavailable for any productively spent "time on task." When this is true for any substantial amount of learner energy within a school building, that school, as a human energy system, is highly entropic. (Entropy being a measure of energy within a system which is unavailable to the effective functioning of that system.)

Thus, it is possible to view materials such as textbooks that are evaluated negatively by their ultimate users (i.e. learners) as examples of technology that are being so ineffectively designed and fitted to the available energy in the systems in which they are being used, that they are contributing to a higher than necessary level of entropy within those systems. This is not to say that textbooks and other materials cannot be designed, selected, and fitted to that same available teacher/learner energy so as to contribute to the reduction rather than to the increase of entropy within a school. However, we must always remember that entropy cannot be eliminated, only minimized. Given this reality, the best that educators can do is to constantly work at keeping entropy from spreading cancerously throughout the educational system. Entropy in the form of boredom, depression, drug use, and distractiveness is dangerously high in many schools.

I believe that it can be demonstrated that appropriate instructional technology (i.e., technology that has been well developed, carefully selected, and fitted to the available teacher/learner energy within a school building)can be an effective means of keeping educational entropy to a minimum. An instructional

material that is evaluated positively by a learner (through its use, and its resultant positive effect on that learner's behavior) is an example of such an appropriate technology. It enables the learner to turn his or her energy into a healthy, entropy-countering flow; in doing so, it puts the learner in touch with the mainstream of productive human energy. It makes the learner part of anti-entropic human evolution.

However, the reality is that most instructional materials being used in schools suffer from either inappropriate, truncated development (most materials have never been shaped through learner feedback during development), or from being poorly fitted to the teacher ("She doesn't like it!"). Or most important of all, being grossly misfitted to learners ("It doesn't help me learn, or it covers what I already know."). Consequently, too many of the materials in the hands of teachers and learners are examples of inappropriate, entropy-increasing technology.

A few years ago when I began to think seriously about building level analyses and evaluation of instructional materials, what I began to find were various measures of what, in my judgment, are significantly high levels of entropy.

One means of taking such measures is through the simple, and rather obvious expedient of measuring the degree to which learners know the content of the textbook that has been selected for their use -- before they use it. With the help of an NIE Grant, EPIE did just this over a two year period in a number of schools in affluent and economically poor communities.[2] In the affluent communities, 60% of the youngsters tested demonstrated that they knew 80% or better of the content of the text (i.e., the curriculum) they were to "learn from" during the remainder of the school year that had just begun. Subsequently, when these youngsters were posttested after having used their texts for nine months, we found regression. In the poorer communities only seven percent of the youngsters demonstrated an 80% or better knowledge of the content of the textbook they were to use during the next nine months. But, not surprisingly,

87% of their schoolmates scored 38% or less before they had begun to receive instruction from their textbook and 38% or less after nine months of "using" it.

In both sets of schools, entropy (that measure of energy in each system that is unavailable to the healthy functioning of the system) was not just significant, but was -- in my opinion -- dangerously high. High enough to have produced boredom and depression among those youngsters who had clearly demonstrated that they had very little to learn from an inappropriately selected and misfitted textbook during a full nine months of instruction. And high enough to have produced depressed or distructive behavior on the part of those less able students who had such a significant amount to learn and whose textbook was so inappropriate and so grossly misfitted to their needs that they, in fact, learned nothing from it over the nine months.

Recently EPIE has begun to use another rather simple way of gathering more learner-specific measures of entropy at the building-level. We have been doing this since January 1982 in a group of elementary schools in New York City and on nearby Long Island. In doing this, we have the advantage of the recently developed Degrees of Reading Power technology (initially created for use in New York State schools and currently being disseminated by The College Board to schools in other parts of the country). This technology (which consists of a measure of an individual student's ability to comprehend extended prose, as measured in DRP units, and a measure of a given material's reading difficulty, also measured in DRP units) is enabling us to arrive at quite precise measures of the misfitting of specific materials to specific learners. For example, in a fourth grade classroom we are finding social studies textbooks ranging from 10 to 15 DRP units higher (more difficult) than the DRP reading ability measures of the majority of the students for whom those textbooks have been selected. Given the fact that four DRP units represents a significant increment of reading difficulty, in any material, then a 10 to 15 unit differential between a student's actual reading proficiency and the required level of proficiency for the text-

book assigned to that student makes such a text an almost insurmountable obstacle to learning. The teachers know this, and tell us that what they do during social studies is to "tell the text to the students" and "try to make it into an interesting story" or that they "sometimes read the text aloud -- stopping to explain the vocabulary and the ideas." Here we have a case of teachers who clearly recognize the entropic condition of all that student energy which can't be put to positive use by the students themselves because of inappropriate teaching tools; and who are trying to get the energy flowing positively by using their own energy to redesign the tool to an appropriate level. Most of the teachers feel they are involved in an almost impossible task.

In an attempt to make the task a more possible one, EPIE has begun to ask teachers to select supplementary (non-textbook) material that they think (1) their students are capable of reading without great difficulty, and (2) would closely correlate with their textbook's content. At present we feel this strategy has potential but only if a teacher's ability in judging the readability of such materials can be sharpened. We are now developing various approaches to sharpening such judgements. But instructional materials-related entropy is not to be found solely in the inappropriateness of the fit of materials to teachers or to learners.

Another, often more subtle contribution to an increase in entropy, may often be found operating within the internal instructional design of textbooks themselves. This entropy inducing condition is identifiable and analyzable in materials in which the actual instructional activities prescribed in the materials are not congruent with the material's stated (or implied) goals and objectives; or with its prescribed or suggested means of evaluating learner performance. EPIE first came across this phenomenon over a decade ago when interviewing learners about their use of a new "discovery-based" social studies

program. The learners, themselves, asked why the program had them doing a range of innovative data-gathering exercises on the basis of which they were to make inferences and draw conclusions, and then, incongruously, tested them on what they described as "the same old facts."

Who can blame these students for evaluating such materials negatively? Likewise, who can expect anything but negative evaluations from students for whom school boards and teachers purchase and assign materials that are either far too difficult or clearly too easy to provide an appropriate level of challenge and a sufficient feeling of accomplishment. Yet, educators and materials' developers are very far from taking seriously these evaluations from the ultimate consumers of the materials they select and develop for learner use.

A few years ago I visualized a schema designed to illustrate the various levels of evaluation that a material goes through before it makes its way into the hands of learners (see attached).[3] In the schema, I have tried to represent how little effect feedback from learners has on these more formal stages of evaluation and screening. One reason for this seems to be the very different sets of values and purposes that are operating during these pre-ultimate evaluations by learners. Here's hoping that these pre-ultimate evaluations will continue to evolve toward the improvements that taking learner's evaluations into consideration would lead to. In the meantime, the macro-level evaluations that currently dominate the present paradigm of textbook evaluation will, no doubt, continue.

The micro-level, entropy-countering evaluation that I have been advocating here will not happen overnight. There will be no revolution in textbook evaluation as long as the unwritten maxim of the textbook industry that ex-textbook editor Eric Broudy put in writing in 1974 continues to prevail.[4] As Broudy put it, the unwritten maxim is: "Yes, but the kids don't buy the books, teachers do." However, as I've gone to some pains to point out, improved instruction depends just as much on improvements in the selection and use of instructional materials

Schema of the Real World of Instructional Materials Evaluation

PREDOMINANT VALUES	EVALUATORS	EVALUATIVE CRITERIA	EVALUATIVE FEEDBACK
corporate	developers/producers (companies)	feasibility (Can it be made at a reasonable cost?) marketability (Will it make it in the market?) profitability (Will it make an acceptable profit?) acceptability (Will it be accepted by committees and teachers?)	
	financial bottom line	(Will it pay?)	
societal	screeners/adopters (committees)	contents (philosophy and coverage) acceptability (ethnic, racial, religious, sex fairness) usability (by teachers and learners, durability) cost (initial and continuing)	
	educational/social bottom line	(Should it have its day or should it stay?)	
group/pragmatic	choosers/prescribers (teachers)	contents (appropriateness, coverage, objectives) understandability (by learners) usability (ease of use and durability) likeability (reactions of kids)	
	instructional bottom line	(Will it play?)	
personal/affective/ utilitarian	users/students (learners)	when in school: Do I enjoy it? Does it make clear what I am to do? Can I do it? What use is it? when an adult: Did I enjoy it? Was it of use?	
	in-structuring bottom line	(Do I love it in December, as, maybe, I did in May?)	

Feedback necessary for continuous improvement of materials is unsystematic and almost non-existent from the ultimate consumer, the learner.

as it does on improvements in development. Thus, a parallel maxim of textbook selection committees seems to be: "Remember, the kids don't select the books." But, of course, both of these unwritten maxims are true: The kids neither buy nor select the books. What these kids do, however, is carry out the only evaluations of the books that really matter. And these evaluations are often greatly influenced by a teacher's attitude toward, and understanding of, the book.

There are two very real tragedies inherent in these inescapable day-to-day learner evaluations of instructional materials. The first is that no one pays much attention to them. The second is that learners, instead of consciously giving a textbook a negative evaluation, when they can't seem to learn from its pages, tend to evaluate themselves negatively.

Textbooks and other instructional materials must be developed and selected in order to meet the learner where he or she is, and then be capable of moving that learner to new levels of knowledge and understanding. As Jacques Barzun has put it: "The reader and writer have both wasted their time, if mental darkness is the only result of their separate efforts. And - this is the very ethics of writing - the reader's part of the effort should never become a strain."[5]

Until such time as both the development and the selection of instructional materials are guided by this ethic, schools will continue to lose out in their ever-present struggle with entropy. Learners, teachers, schools and society will continue to be less than they can be.

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